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gama) was a rare one and had never before been introduced into this country, the plants were put in the greenhouse and carefully watched, but before they had made much growth the propagator, Mr. Dawson, observed that some animal was eating their tender shoots. There were no rats, as a cat was kept constantly about and Mr. Dawson was puzzled to discover what new kind of pest he had in his greenhouse. The thought that the damage was done by cats never occurred to him, until, after the plants were severely injured, when he discovered some cat hairs on the half-eaten branches, and, watching more closely, he caught the hothouse cat eating not only the small tender shoots, but the large woody twigs as well.

In the spring he set out over a hundred small vines in a cold frame but, to his surprise, after removing the protection which the sash afforded, the cats of the neighborhood destroyed the whole bed, eating the plants to the ground. They were not just nibbled, as are catnip or valerian, the only other plants known to be eaten by cats, they were completely destroyed—gobbled up—even to stalks as big as a lead pencil.

No place in the arboretum is now concealed enough to be safe from ravage, and the few two-year-old vines in it are completely protected by wire nettings. Every leaf or twig on these caged vines which is near enough the wires to be within reach of claws is scratched and torn to bits. In a few months time this entirely new plant from the interior of China has become the most relished vegetable which our American cats have ever tasted.

The plant has no odor that we can detect, neither has it any distinct taste. Did the cats scent it, or do cats, which are carnivorous animals, make a practise of tasting every new plant that comes within their ken? If they do, they certainly excel in investigative faculties the most civilized races of human beings. Then too, how did the news spread so that in a few months after its introduction all the cats of the neighborhood knew of it? Did the greenhouse cat communicate his discoveries

to his friends, or did each cat make the test independently?

The whole story throws an interesting sidelight on cat instinct and intelligence and starts a score of questions. It is difficult to see how there can be here an instinct inherited through long generations of ancestry, for the plant has been unknown in Europe and America until a few years ago. It seems to show an alertness of cat intellect which is most remarkable and which is in sharp contrast with the reluctance of the average human being to taste new things.

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DEPARTMENT OF AGRICULTURE.

SPECIAL ARTICLES.

EVIDENCES OF SEVERAL GLACIAL AND INTERGLACIAL STAGES IN NORTHEASTERN NEW ENGLAND.¹

WHILE conducting an investigation of the underground water resources of northeastern New England during the present field season, the writer has had occasion to visit many parts of northeastern Massachusetts, southeastern New Hampshire and southern Maine, and has incidentally noticed numerous cuts and exposures which throw light on the differentiation of drift in this long-neglected section of the country. There seems to be no longer any doubt that in northern New England, as elsewhere, there have been at least three distinct ice advances, separated by interglacial stages; and when more evidence has been obtained it will probably be possible to definitely correlate them with those of southern New England.

The writer hopes in the near future to publish a detailed account of his observations and conclusions. In the meantime a brief statement of the formations observed and their possible correlations with deposits in other sections may be of some interest.

1. *Pre-Pleistocene (Probably Tertiary) Clays.*—A deep boring made in Boston in 1905 penetrated over 100 feet of a fine light gray to white, very pure clay, underlying all glacial deposits. This clay appears to be of

¹ Published by permission of the director of the U. S. Geological Survey.

pre-Pleistocene age and later than the Carboniferous bed-rock of the region. Similar deposits are reported in borings elsewhere in Boston and were noted by Crosby in his report to the Committee on the Charles River Dam. Samples of this clay from the boring mentioned above were examined by the writer in the office and compared with specimens of various Quaternary, Tertiary and Cretaceous clays, and were found to be almost identical in appearance with much of the Cretaceous clay from borings on Long Island described by Veatch and called by him Raritan.

2. *Unconformity.*

3. *Very Ancient Till.*—This was observed at Lawrence and Haverhill, Massachusetts, at Norridgewock, Maine, and at a few other localities. It is composed of a larger percentage of local material than are the common tills of the region, is deeply oxidized, of a brighter yellow color, and very rotten. A few rounded pebbles of quartzite and similar durable rocks are contained in it, but no granitic or diabasic rocks could be found. These deposits are believed to correspond in age to the old tills described by Fuller in southeastern Massachusetts, with the Mannetto gravels described by Fuller and Veatch on Long Island and elsewhere and with the Kansan or the pre-Kansan till of the middle west.

4. *Unconformity.*

5. *Stratified Fossiliferous Clays.*—Small exposures of these beds underlie drumlins at Winthrop and Revere, Massachusetts, and the material derived from the clays, with its contained fossils, is incorporated in the drumlins of Boston Harbor. The deposits have been correlated by Fuller with the Gardiner clay of Long Island and Cape Cod. Local clays which are possibly of this age have been observed in Maine.

6. *A Thick Deposit of Till.*—This is the principal till sheet of New England, including hardpan deposits of sand, gravel, clay and bowlders, often of great thickness, covering all older formations. It includes the drumlins of Massachusetts and New Hampshire. Where it has not been eroded this till is yellowish from the effects of oxidation to a depth of five

to fifteen feet. Until recently it has been considered of Wisconsin age, but Fuller has lately thrown it into the Illinoisan, correlating it with the Montauk of Long Island. The evidence collected this summer of a more recent till, confirms this correlation.

7. *A Great Thickness of Coarse Gravels.*—These are well developed in the Kennebec, Androscoggin and Penobscot valleys, and their relations are perhaps best exposed in the vicinity of Augusta, where they may be seen resting on (6) and overlain by (9) and (10). They were deeply eroded before the deposition of overlying deposits. These gravels may be equivalent to the gravels described by Fuller as overlying the Montauk till on Long Island, etc.

8. *Unconformity.*

9. *Fossiliferous, Stratified, Blue-Clay* ("Leda-Clay" of Jackson, Hitchcock, Packard and others).—This is an extensive deposit, rising from about twenty feet above tide in the vicinity of Boston, to over 200 feet in the Kennebec and Androscoggin valleys and found throughout the coast region and larger valleys between Boston and Eastport. This clay is well stratified, frequently fossiliferous, and is deeply oxidized. It is occasionally folded and contorted and often overlain by sand deposits and generally by till. Fossils, where found, most often occur near the bottom of the clay beds, and stones are most frequent in the upper part. The folding and unconformity can be observed at Saugus and Haverhill, Massachusetts; at Portland and Augusta, Maine, and elsewhere. The presence of till both above and below the clay places it most probably in the interval between the Illinoisan and Wisconsin glaciations, and it may have been deposited at about the same time as the Iowan loess, to which its relations are rather similar.

10. Overlying the clay in some localities are a few feet of stratified sands, rising to the same general level as the clay, probably being a part of the same series. These, together with some of the Wisconsin sands, were called 'Saxicava sands' by the early geologists.

11. *Unconformity.*

12. *A Few Feet of Till*.—This till generally occurs as a thin deposit three to ten feet in thickness, but occasionally seems to be thickened up in the form of drumlin-like deposits amounting to as much as fifty feet. It is generally more gravelly than the Montauk type of till, and the oxidation does not often extend over three to five feet from its surface. This till can be seen resting on clays and gravels throughout this part of New England, but the best section is probably in the vicinity of Augusta. This till is believed to be the true Wisconsin till of New England.

13. *Retreatal Deposits of Sand, Gravel and Local Clays*.—These occur over wide areas in Massachusetts, New Hampshire and southern Maine. They were formed in part in glacial lakes and in part as outwash deposits in the sea or above water level.

14. *Deposits of Local Glaciers*.—In several localities in Maine: (a) In the territory directly east and southeast of Mt. Katahdin in northern Penobscot County, (b) in the mountainous region between Bangor and Ellsworth in Hancock County, and (c) in southern Piscataquis County, there is considerable evidence from direction of striae, amount of oxidation, position of moraines, etc., indicating probable local glaciations somewhat later than the Wisconsin ice advance.

In closing this abstract the writer wishes to acknowledge his indebtedness to Mr. G. C. Matson, who assisted him in the underground water investigations and obtained many data helping towards a solution of Pleistocene problems.

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CURRENT NOTES ON METEOROLOGY.

THE FIRE-SHIP OF BAY CHALEUR.

In his 'Notes on the Natural History and Physiography of New Brunswick' (*Bull. Nat. Hist. Soc. New Brunswick*, xxiv, Vol. V., 1905) Professor W. F. Ganong has a short paper, 'On the Fact Basis of the Fire (or Phantom) Ship of Bay Chaleur.' After an examination of all the evidence it appears to the author plain (1) that a physical light is

frequently seen over the waters of Bay Chaleur and its vicinity; (2) that it occurs at all seasons, or at least in winter and summer; (3) that it usually precedes a storm; (4) "that its usual form is roughly hemispherical with the flat side to the water, and that at times it simply glows without much change of form, but that at other times it rises into slender moving columns, giving rise to an appearance capable of interpretation as the flaming rigging of a ship, its vibrating and dancing movements increasing the illusion." This is doubtless a manifestation of *St. Elmo's Fire*, but the compiler of these notes is not aware of any reports of similar phenomena, of such frequency in one locality, and of such considerable development. Professor Ganong cites the case of some lights reported around Tremadoc Bay in Wales, but notes that they in all probability had only a subjective basis. Lights of unexplained origin, the author notes, were reported as common off the Welsh coast two hundred years ago, and mention is made of *St. Elmo's Fire* observed at Anticosti. The phenomenon described by Professor Ganong is an interesting one, well worthy of careful study.

MONTHLY WEATHER REVIEW.

The Monthly Weather Review (No. 5, 1906) contains the following papers of general interest: 'Present-Day Climates in their Time Relation,' by F. M. Ball, of the University of Minnesota, a brief review of some of the more important facts regarding climatic changes, with the emphasis on geological changes. 'Severe Hailstorm in the Gulf of Mexico,' reported by R. G. Bindley, officer of the S. S. *Jamaican*. This storm occurred on March 18 last; the hail was so heavy that the ship was stopped and the officer of the watch and the helmsman were compelled to seek shelter. The first officer received a severe bruise caused by a hailstone striking the back of his neck, and the helmsman received a scalp wound. The stones dented the binnacles and chipped paint off rails and other painted surfaces. 'Tornado in Australia,' an account based on notes by H. A. Hunt, government meteorologist of New South Wales. This tornado was